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RURAL ELECTRIFICATION ADMINISTRATION

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SUBJECT: REA Bulletin 322-1: TE&CM-206
Area Coverage Survey

TO : REA Telephone Borrowers

Enclosed is a revision of REA Bulletin 322-1: TE & CM-206, "Area Coverage Survey." This revision incorporates the changes in the preloan procedures for supplemental loan applications specified in the recently revised REA Bulletin 320-14, "Loans for Telephone System Improvements and Extensions."

A principal change from current procedures is that borrowers submitting a loan application for areas previously financed by REA will not be required, in the preloan stage, to prepare new Area Coverage Survey (ACS) maps showing the location of all existing and potential subscribers; provided the borrower's records contain sufficient information as to the subscriber development to enable cost estimates for the proposed facilities to be prepared. Borrowers will, therefore, be able to conduct their field survey and update their ACS maps in the postloan stage. The preparation of the Outside Plant Layout can then be prepared on a more timely subscriber data. New loan applicants and borrowers planning service to exchange areas not currently served by REA-financed facilities are still required to prepare ACS maps in the preloan stage.

Other changes include:

1. Revised guidelines and suggestions, in Appendix A, of steps which may be followed in preparing an ACS. It is hoped that these new guidelines will prove valuable to you and your staff in the important task of forecasting subscriber service requirements.

2. A revised REA Form 569, "Area Coverage Survey Report," which requires slightly less detail to complete. Appendix B provides new instructions for completing this form.

The REA Loans and Operations Field Representative will be available to review the changes in the requirements and procedures for preparing an ACS with you and your staff.

This bulletin should replace, in your files, all previous editions and memoranda.

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Assistant Administrator - Telephone

Enclosure

REA BULLETIN 322-1: TE&CM-206

MAY 1971

AREA COVERAGE SURVEY

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Appendix E, Statistical Techniques in the Forecasting Process

REA Bulletin 322-1

SUBJECT: Area Coverage Survey

I. Policy:

A. The Area Coverage Survey (ACS) is a market forecast to determine the service requirements of subscribers in the proposed service area. REA requires the submission of an ACS in support of a loan application (see REA Bulletin 322-2). It serves as the basis for determining: (1) that telephone service will be provided on an area coverage basis, (2) the design of the telephone system, (3) the investment required for the construction of the system, and (4) the economic feasibility of the proposed system. Any or all of these factors may be distorted by errors in forecasting subscriber service requirements. It is essential, therefore, that the ACS be conducted with care.

II. Procedures and Requirements:

A. A loan applicant should discuss the preparation of an ACS with the REA Loans & Operations Field Representative. The loan applicant may select the forecasting method best suited to its individual needs with the approval of the REA Loans and Operations Field Representative. Agreement should be reached on the method to be used in preparing the ACS, the personnel to be involved, the various social, economic, and statistical factors to be considered, and the time the survey should start.

B. The responsibility for the development of a sound forecast rests solely with the loan applicant. If a loan applicant is unable to prepare the ACS, it may employ the services of a consulting engineer (see REA Bulletin 320-4, "Preloan Procedures for Telephone Loan Applicants"). The engineer's work will be expedited and costs will be kept to a minimum if the applicant assigns one or more of its employees to work with the engineer.

C. All loan applicants will include in their ACS a forecast of the number and grades of service of existing and potential subscribers. In addition, initial loan applicants and present borrowers planning service to new areas will prepare ACS maps showing the location of all existing and potential subscribers in the proposed service area.

D. Borrowers submitting a loan application for areas previously financed by REA will not be required, in the preloan stage, to prepare new ACS maps showing the location of all existing and potential subscribers; provided the borrower's records contain sufficient information as to the subscriber development to enable cost estimates for the proposed facilities to be prepared.

E. Upon completion of the forecast, the loan applicant will submit the ACS maps (when required), subscriber tabulations (REA Form 569) and the supporting narrative to the Loans and Operations Field Representative for review. When the Loans and Operations Field Representative approves the ACS, he will arrange a meeting to review it with the applicant, its engineer, where employed, and the REA Field Engineer. Approval of the ACS results by the REA field personnel will constitute REA approval for the purpose of proceeding with engineering studies.

F. After agreement is reached on the maps (when required), narrative and subscriber forecast, the consulting engineer, where employed, will retain the information required for preparation of the engineering studies and cost estimates. The Loans and Operations Field Representative will forward a copy of the narrative and a set of REA Forms 569 to the REA Area Office.

G. Where borrowers do not prepare new ACS maps in the preloan stage, it will be necessary that a field survey and subscriber signup be made, and existing maps be updated or new ones prepared, prior to preparation of the Outside Plant Layout for the new loan project. The borrower and its engineer should discuss the preparation of the field survey, subscriber signup and preparation of maps for the Outside Plant Layout with the REA Loans and Operations Field Representative and Field Engineer before starting. The results will be reviewed by the same representatives of the borrower and REA to reach agreement on the results of the survey and the basis for the outside plant layout.

H. In those instances where the ACS maps were prepared in the preloan stage, the Loans and Operations Field Representative will arrange, as soon as practical after a loan has been made, a meeting with the borrower, the Field Engineer and, where employed, the project engineer to determine if any changes should be made in the subscriber projections and the procedures to be followed in the subscriber signup before proceeding with the staking of the outside plant facilities.

III. General:

A. Appendix A provides guidelines for the factors to be considered in subscriber forecasting and for the preparation of data for inclusion in the ACS.

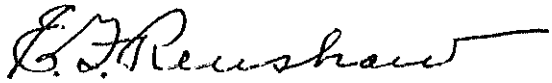
B. Appendix B provides instructions for the completion of REA Form 569, Area Coverage Survey Report.

C. Appendix C provides some sources of statistical data covering population and economic trends.

D. Appendix D provides guidelines in the form of a checklist for review of the ACS data.

E. Appendix E provides some statistical techniques which may be helpful in the forecasting process.

This publication supersedes all other material in conflict with its provisions.



Assistant
Administrator

Attachments:
Appendix A, Guidelines for Preparation of an Area Coverage Survey
Appendix B, Instructions for Preparing REA Form 569
Appendix C, Reference Material Available on Population and Economic Trends
Appendix D, Checklist for Review of an Area Coverage Survey
Appendix E, Statistical Techniques in the Forecasting Process

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APPENDIX A

Guidelines for Preparation of an Area Coverage Survey

1. The Area Coverage Survey:

1.1 The Objective: The objective of an Area Coverage Survey is to determine the service requirements of subscribers in the proposed service area. It includes a forecast of (1) the number of telephone subscribers, by grade and class of service, which will be in service at the end of a five year period from the time of the survey, and (2) the location and total number of establishments that will be connected during the five year forecast period.

1.2 What Needs to be Done: The steps involved in preparing an area coverage survey include:

1. Conducting a survey to determine the location of present and proposed future establishments in area to be served. This includes identifying each business and residential unit on a map and tabulating it as a subscriber or an unserved establishment. (Section III of this Bulletin provides REA procedures and requirements concerning when the survey should be conducted.)

2. A review and analysis of:

 a. past subscriber development by exchanges;

 b. the causes of change in past demand trends for service by exchanges;

 c. the causes of differences between previous subscriber forecasts, if any, and actual experience;

 d. the inward and outward movement of telephone service and its relationship to net subscriber gain; and

 e. the economic and social factors which will likely affect future demand for service.

3. Preparing the forecast. The results of the forecast should be shown on the maps, tabulated on REA Forms 569, and supported by a narrative containing the information relevant to the forecast of telephone service requirements by exchanges.

2. Preparing for the Survey:

2.1 Determining the Area to be Surveyed:

2.11 The first step is to determine tentative boundaries of the proposed service area and proposed exchange areas.

2.12 REA loan applicants and borrowers are requested to consider the possibilities of providing service not only to establishments within the present service areas but to all adjacent unserved areas as well. This may involve:

2.121 Acquiring and consolidating properties.

2.122 Determining the calling area requirements of the potential subscribers.

2.123 Consolidating existing or establishing new central office areas.

2.124 Discussing these matters and any necessary revisions of certified areas with adjacent telephone companies and appropriate regulatory agencies.

2.13 The boundaries of the proposed service area and the location of proposed exchanges should be discussed with the REA Loans and Operations Field Representative and agreement reached on the territory to be surveyed before the survey is undertaken. Exclude areas served by or certified to other companies from the proposed survey area unless firm commitments have been obtained from the owners of these companies to sell their facilities or relinquish the area to the applicant.

2.14 The borrower will be expected to (a) carry out its responsibilities for extending telephone service within its system boundaries, (b) serve rural subscribers without payment of contributions in aid of construction and, (c) provide service without mileage or zone charges for the lowest grade of service offered (flat rate service).

2.2 Selecting Personnel for the Survey:

2.21 The personnel selected by the applicant to conduct the field survey should be thoroughly familiar with the area and knowledgeable of trends for service by the residents in the area.

2.22 It is advisable to have two men work together as a survey team in order to check each other's judgement. If it is necessary to engage a consulting engineer for this purpose, one member of the survey team should be the engineer or a member of his staff and the other an employee of the applicant who is familar with the particular territory being surveyed.

2.23 Where the area to be served involves several central offices, the survey job may be divided into sections for a number of teams. It will be necessary to maintain close coordination of the survey teams.

2.3 Obtaining Necessary Maps and Worksheets:

2.31 Worksheet Maps:

2.311 Good maps are essential for the completed ACS, preparation of the engineering studies and cost estimates, and later in the construction and operation of the system. "As built maps" should be brought up to date by a thorough check with the billing and plant records. If a new loan applicant does not have "as built maps", then county or state highway planning maps town plots, topographical maps, electric utility maps or other suitable types may be used. Such maps can be used as worksheet maps for recording the necessary field data. The worksheet maps should show the location of highways and central office boundaries.

2.312 Each survey team must record the survey data on a worksheet map. The suggested minimum scale for this map is: 2" = 1 mile. Each team should also have detail maps for each small village or other densely settled area where the number of establishments is too great to be recorded directly on the worksheet map. The suggested scale for town or village maps is: 1" = 200 feet.

2.313 Prior to starting the field work the borrower should enter the following information on each worksheet map:

a. A legend of all the symbols to be used: (See Section 3.211 of this Appendix).

b. The location of the proposed system boundaries and the names of companies serving adjacent areas. Where the proposed service area will surround an area to be served by another telephone company, the limits of such area should be indicated.

2.32 Survey Worksheets: A sample worksheet for field survey data is shown on page 20. These forms can be reproduced locally.

2.4 Determining the Survey Routes:

2.41 Determine the survey routes in advance of the survey. This will assure that the area is completely covered and prevent any duplication of data or overlapping by the survey teams.

2.42 When a central office area is to be covered by more than one survey team, assign each team a specific block of numbers to identify establishments.

2.43 When more than one area is being surveyed, it is generally desirable to start numbering the establishments in each area from one because of the space required by three and four digit numbers on the worksheet map.

2.44 Furnish each team with the survey material (worksheet maps and survey worksheets) and give a copy of the survey routes to the coordinator so that he can check the progress of the survey after it is under way.

3. Preparing the Survey:

3.1 Preparation of ACS Maps: Office records will furnish the grade and class of service and location of existing subscribers and held orders. Such records should be reviewed for accuracy. These establishments should be recorded on the worksheet maps using the identification symbols shown in 3.211.

3.2 The Field Survey: As the survey teams travel their assigned routes they should verify the location of existing subscribers and record the location of each unserved establishment on the worksheet map. Suggested symbols for identifying unserved establishments are shown in 3.211.

3.21 On the Worksheet Map:

3.211 Location of Establishments and Identification Symbol:

Symbol	
	Existing subscriber.
	Existing service station which will continue to be switched by the applicant in the proposed system.
	Seasonal subscriber.
	Signed subscriber (held order or application on file).
	Unserved establishment which is inhabited.
	Unserved establishment which is vacant but capable of being inhabited.
	Future establishment. (If the location of individual future establishments are known.) Also, see Section 3.33.
	Unserved establishment which is vacant and not a prospect for service.
	Unserved seasonal establishment.

3.212 The establishment identification number: Assign an identification number in regular numerical order to each establishment surveyed; for example:

I 6 Unserved inhabited establishment No. 6.

I 7 Unserved vacant establishment No. 7.

3.213 Type of service: When more than one grade of service is to be offered, and when the type of service desired is known record it above the establishment number using the appropriate symbol. These symbols are:

B1 - One-party business.

RB - Rural business (multi-party service - lowest grade offered).

PS - Paystation.

PBX - Private branch exchange.

R1 - One-party residence.

R2 - Two-party residence.

- Rural residence. The absence of a service symbol indicates a rural residence taking the lowest grade of service offered (RR).

3.214 The following are examples of information recorded on the worksheet map:



- Existing subscriber, rural business, establishment No. 30.



- Signed subscriber, two-party residence, establishment No. 31.



- Unserved, inhabited rural residence, establishment No. 32.



- Existing subscriber, four-party residence requesting one-party residence, establishment No. 33. (not necessary when upgrading to all one-party service).

3.215 In many situations only portions of an exchange area may be shown on a single map. The recommended way to handle such situations depends on whether the grid or township method of mapping is followed. Numbering of establishments and cross-references to the tabulation sheets will be simplified if each establishment within the grid squares receives a number designation starting at one and numbered consecutively within the grid. Similarly, if the township method is used in mapping, each establishment will be identified by a range, township, and section designation.

3.216 A typical cross-reference to the worksheet, when grid maps are employed, might appear as follows:

Map Ref. No.	Name and Address	Proposed Grade of Service Existing	Signed
2-7-3	J. Jones, RFD #4, Salem	RR	xx
2-7-4	G. Davis, RFD #4, Salem	xx	R2

The first number under the map index is the map number (2). This is followed by the grid reference number on this map (7), and the third number is the subscriber number within the grid (3).

3.217 The indexing of establishments where township maps are employed might be as follows:

Map Ref. No.	Name and Address	Proposed Grade of Service Existing	Signed
R3W-T12N-S2-1	D. Doe, RFD #2, Adair	xx	RR
R3W-T12N-S2-2	A. Sac, RFD #2, Adair	RR	xx

The first reference is the range number, the second is the township, and third is the section, while the fourth reference is the number of the subscriber.

3.22 Suggestions for Use of Survey Worksheets (See page 20)-Enter:

3.221 The establishment identification number (map reference number).

3.222 The name of the family living in the establishment, if available, the address of the establishment, or other identifying information.

3.223 Proposed grade of service for existing subscribers and signed applicants or held orders. This may have to be completed from office records.

3.224 Prospect identification ("I", "V" or "S") for potential subscribers.

3.225 Any remarks which might be appropriate.

3.3 Criteria in Identifying Establishments:

3.31 It may be helpful in the forecasting process if unserved establishments are identified with certain symbols. Unserved establishments which are inhabited may be identified with the symbol "I". Vacant establishments which appear to be inhabitable can be identified with the symbol "V". However, where the general trend in the area is such that vacated buildings are being removed or torn down and if it appears that the dwellings have been vacant for some time, do not consider these establishments as prospects for service. Designate such establishments as "N".

3.32 Seasonal establishments may be identified with the letter "S" next to the circle showing its location on the map. If the establishment is a subscriber during the seasonal period, the identifying symbol will be shown as S . (This symbol should be used even when the establishment is disconnected during the off season.) If the establishment is not a subscriber identify it as S I .

3.33 Where knowledge of individual future establishments are known use the symbol "F". Where a housing development is under construction or pending, draw lines on the worksheet map around the limits of the proposed development. Indicate the total number of housing units planned.

3.34 Where there are apartment or multiple dwelling units, consider each apartment as a separate establishment.

3.35 When the field survey is being done in the postloan stage see Section 4.84 of this Appendix for discussion of subscriber signup.

4. The Forecast:

4.1 Analyzing the Past:

4.12 An essential step in the forecasting process involves a careful analysis of population and economic trends in the area and their relationship to subscriber development. It should be remembered, however, that the past history of the system should influence, but not determine projections of future development.

4.13 It is suggested that the analysis of past trends cover a period of ten years. If it is determined that the trends in the past five years are more relevant, then this period should be used. In those instances when an exchange has been cutover to dial service less than ten years, use the period since cutover.

4.2 History of Subscriber Development:

4.21 Prepare a station history for each exchange showing the number of subscribers by grade and class of service. A station history for a ten year period is recommended.

4.22 In addition, the total inward and outward movement of telephone service during the study period should be reviewed. The objective of the review is to attempt to determine the total number of establishments which have been connected compared to the number of subscribers presently in service. One approach can be to subtract the total number of reinstalls and reconnects from the total disconnects. The result should provide an indication of the increase in the number of idle services for the period reviewed.

4.23 Compare past forecasts with actual experience.

4.3 Trends in Population and Households:

4.31 Analyze the trends in population and occupied households during the study period. Areas may be described according to the changes in occupied households over the past ten years as follows:

Percent Change in Number of Occupied Rural Dwellings	Area Description
Over 10% increase	Abnormal Growth
2-10% increase	Normal Growth
0-2% increase	Stable
Reduction in number	Declining

4.32 The analysis of population trends should distinguish between trends in towns and suburban areas and that in strictly farm areas. While population may increase in towns and areas along main highways, population in the strictly farm areas may be static or experiencing an outward migration.

4.33 Sources of reference material for use in analyzing population trends are listed in Appendix C.

4.4 Economic Trends:

4.41 Analyze the economic trends during the study period. Review the economic trends in farming and/or ranching, business and industrial development, level of employment and family income.

4.5 Relationship of Data:

4.51 Relate the most relevant factors in the economic and population trends with subscriber development.

4.6 Analyzing Present Conditions and Future Trends:

4.61 Discuss with local farm officials, county agents, soil conservation officials and state agencies their assessment of future farm and/or ranching conditions in the service area. Particular items to discuss would be their assessment of farm consolidations in the future and the trends in occupied households.

4.62 Discuss with local businessmen, bankers, mortgage companies and others their assessment of future business and industrial growth and its possible effect on trends in population, employment and family income.

4.63 Review with forecasters in other utilities operating in the same service area their forecasting trends.

4.64 State universities may provide information on business, farming and population trends in areas of the state.

4.65 Review any available county economic studies and master plans for the area.

4.7 Forecasting Future Establishments:

4.71 The most difficult and significant portion of the forecasting process, especially in unusual growth situations, is the projection of establishments which are not in the area at the time the survey is conducted. Discussions should be held with real estate firms, developers and bankers to determine where, when and how many new homes may be constructed. Care should be exercised in discussions with developer's since many tend to be overly optimistic.

developer's past record of accomplishments and accuracy should be determined before accepting his forecasts at face value. Past experience has indicated that subdividing or platting of areas does not assure that construction will immediately follow.

4.72 The impact of new or broadened highways should always be considered in the preparation of the ACS. This will assist in planning the pole line routes, buried plant locations, and future telephone requirements. A new four-lane highway (unless it is "limited-access") will be followed, in most instances, by filling stations, motels and restaurants, with a consequent demand for telephone service. Areas near entrances to "limited-access" highways can be expected to develop. Confer with State and County highway planning officials on highway construction planned within the telephone service area. The plans of these officials will usually be established for many years ahead and can usually be depended upon, particularly where construction funds have already been appropriated.

4.73 Trailer courts have developed rapidly in the past few years and their growth can be expected to continue. These courts, generally, are planned for either transient customers (six months or less) or for those settling their trailers on a long term or permanent basis. Usually, a higher percentage of residents of trailers located on a long term basis will be prospects for service. Consideration should be given to contacting county officials to determine if any sites for trailer courts are being proposed in the service area. Where there are indications of a trailer court being established, discussions should be held with the owner to determine the proposed size of the court and the type (transient or permanent) of customers they will serve. Care should be exercised in discussions with owners of trailer courts as some tend to be overly optimistic in their development plans.

4.8 Forecasting Service to Unserved and Future Establishments:

4.81 It is necessary to determine the percentage of unserved and future establishments which can be expected to take service in the next five years. Each exchange should be studied separately. Where the characterics of unserved establishments differ within the exchange, percentages should be applied by sections of the exchange. It may even be necessary to refine the process to the extent of applying percentages to unserved establishments along individual pole line or cable routes.

4.82 In areas where a significant number of unserved establishments are vacant, percentage factors for unserved establishments should be developed separately for inhabited establishments and vacant establishments. Past trends of inward subscriber movement, projected economic trends and the company's plans for merchandising are the key indicators for increased saturation of the unserved market. Percentages applied to vacant establishments (assuming that the establishments are capable of being inhabited and were not designated as "N") in stable or declining areas will, generally, be low.

4.83 If the field survey is being conducted in the preloan stage, interview a representative sample of unserved establishments to determine the interest for service in the future. The sample should be random and consistent to obtain reliable results. Where the characteristics of the exchange areas (or parts of areas) differ, separate sample interviews should be made. There are indications, in certain parts of the country, that service saturation levels increase when telephone systems upgrade their service, especially to all one-party service. The introduction of new services, such as extended area service, may increase the demand for service from unserved residents.

4.84 When the field survey is conducted in the postloan stage, plans should be developed to interview all unserved establishments. Personal contact by a representative of the telephone system will be the most effective approach. The representatives should be thoroughly familiar with the services available and rates, and should be knowledgeable in the techniques of merchandising. In addition, where more than one grade of service is being proposed for the rural areas, plans should be developed for contacting existing subscribers to determine what grade of service they will desire in the proposed system.

4.85 The percent of future establishments expected to take service will, generally, be high. In most areas, each new establishment should be expected to take service. The price of the houses (or expected monthly rental if they are apartment units) may affect the percentages that will be applied.

4.86 The percent of unserved seasonal establishments expected to take service will depend upon the characterics of the units Small weekend type cabins will, generally, be poor prospects for service. Larger, more permanent type structures, which are usually occupied for the entire summer season will, generally, be better prospects for service.

4.87 Record the percentages to be applied to the unserved and future establishments on the ACS maps by category (occupied, unoccupied, seasonal, future establishments, etc.). The percentages applied should be shown on either an exchange basis, a section basis or on a lead basis. This information should also be included in the narrative report accompanying the ACS tabulation.

4.9 Forecasting Outward Movement of Telephone Service:

4.91 The inward movement of telephone service was discussed in sections 4.7 and 4.8. The projection of total inward movement is essential for forecasting outside plant requirements for the engineering studies and cost estimates. All telephone systems, however, experience an outward movement. In certain areas of the country, the outward movement may be substantial and permanent. An analysis of existing idle services can be a clue as to how seriously this should be considered. If the number of idle services exceeds 5% of total subscribers in service at the time of the study, consideration should be given to projecting the outward movement in the forecast to determine the net subscriber gain. This will enable financial projections to be made on a realistic basis.

5. Preparing the Forecast:

5.01 It may be easier to arrive at the fifth year subscriber estimate if the forecasting is done on a year to year basis. In addition, forecasting on a year to year basis will be an aid to management in its financial and construction planning. Worksheets may be structured to show total inward and outward movement and net subscriber gain for each of the years in the forecast. It is necessary to tabulate only the fifth year subscriber estimates on REA Form 569.

5.1 Grades of Service:

Rural subscribers have, in the past ten years, been requesting higher grades of service. This demand can be expected to accelerate even more in the future. Today, the need and desire for one-party service by rural subscribers is the same as that of urban subscribers. REA recommends that borrowers and new loan applicants, planning major upgrading, consider providing all one-party service. If studies prove that one-party service is not feasible, borrowers should plan for not more than four-party rural service.

5.12 If a borrower is uncertain as to the willingness of the subscribers to pay the rates required for one-party service, consideration should be given to the preparation of alternate cost studies to establish the investment and rate requirements. REA will provide assistance in determining rate requirements.

5.13 Planning for all one-party service should be made on the basis of providing the service on a flat rate basis (no zone or mileage charges) since this will be the lowest grade of service offered.

5.14 When a telephone system plans to upgrade to four-party rural service, consideration should be given to providing one-party service to those rural subscribers who need and desire it. Consideration may be given to providing both the one- and four-party service on a flat rate basis in the rural area. If this approach does not prove feasible, then consideration should be given to providing the one-party service on a zone rate basis.

5.15 When offering both one- and four-party service extreme care must be given in forecasting the demand for each grade of service. Errors in forecasting this demand can result in idle plant or excessive investment from frequent reinforcement, both of which carry cost penalties. An actual canvass of the area should be made to aid in determining grades subscribers need. It can be expected that the lower the rate differential between the grades, the higher the demand will be for one-party service.

5.16 When upgrading to four-party rural service the grade of service offered in the base rate area should be limited to one-party service. If this is not possible, then the grades should be limited to one- and two-party service. Offering three grades of service in the base rate area (1-, 2- and 4-party) usually results in a reduction in plant efficiency and an increase in costs without corresponding benefits. The offering of 4-party service in the base rate area also causes difficulties in rate making and in public relations and should be avoided whenever possible.

5.17 Borrowers retaining eight-party rural service should consider eliminating the offering of four-party service in the base rate area when it is necessary to add plant facilities in the base rate area.

5.18 Consideration should be given to providing at least one public paystation in each exchange area. Install additional paystations only where the demand and anticipated revenue justify the investment. As a rule-of-thumb, average monthly net revenue of $20 will be required to cover the annual carrying charges on a public paystation.

5.2 Forecasting Supplemental Services:

5.21 A careful analysis should be made to determine the extent of the subscriber market for supplemental services. It should be remembered that the market for supplemental services will not develop by itself. The market will develop in proportion to the manpower and other resources the telephone system devotes to merchandising.

5.22 The resident market: Rural telephone systems as a whole lag far behind systems serving urban areas in supplemental services to resident subscribers, especially in regard to extension stations. Admittedly, it is difficult to sell extensions to subscribers who have multi-party service. The value of extension telephones increases, however, with higher grades of service, and especially with one-party service. Systems upgrading to one-party service should plan extensive merchandising efforts for extensions. The market for second lines should be explored, especially when upgrading to all one-party service. Families having a large amount of telephone usage would benefit from a second line in their home. These include families with teenage children. Again, the success in developing this market will be in proportion to the sales effort extended. Estimates for the sale of extensions and auxiliary lines should be based on the system's planned merchandising efforts.

5.23 The business market: The type of business establishments and industrial concerns presently in the area, and those expected in the area in the next five years, should be analyzed to determine service presently provided and what will be needed in the future. This market, like the resident market, will develop only in proportion to merchandising efforts extended. The expected market for key systems, PBX and PABX should be estimated and shown on page 2, parts C and D of REA Form 569. The market for other services including data phones, TWX, etc. should be summarized in Part F on page 2 of REA Form 569.

6. The ABC Method of Forecasting:

6.1 Classifying Unserved Establishments: Another approach to classifyi unserved establishments as prospects for telephone service is terme the "ABC" method. This method is applicable, generally, to areas where service has not been available and areas where telephone service saturation is relatively low. The basic steps in this forecasting process will be the same as outlined previously except for the manner of classifying unserved establishments when conducting the field survey and the approach used in developing percentages to be applied to unserved establishments as prospects for service. The method for projecting future establishments explained in previous sections should be incorporated in this forecasting approach.

6.2 The Field Survey: When conducting the field survey, the survey team should verify the location of existing subscribers and record the following information for each unserved establishment:

6.21 On the Worksheet Map:

6.211 Location of establishment and identification symbol:

Use the following symbols to identify and locate each establishment on the worksheet maps in accordance with the criteria established prior to the start of the survey:

Symbol	Description
●	Existing subscriber.
● SW	Existing service station which will continue to be switched by the borrower in the proposed system.
◒	Signed subscriber (held order or application on file).
S ●	Seasonal subscriber.
(A)	"A" prospect, inhabited establishment.
(B)	"B" prospect, inhabited establishment.
(C)	"C" prospect, inhabited establishment.
(N)	No prospect.
V (B)	"B" prospect, vacant establishment.

6.3 Establishing Criteria for Classifying Potentials:

6.31 Classify each unserved or unsigned residential establishment as a prospect for service from the standpoint of the physical characteristics of the farmstead or rural dwelling.

6.32 Evaluate the physical characteristics in terms of the social and economic character of the community.

6.33 Where an establishment is also a place of business, consider the needs of the business for service along with the characteristics of the establishment.

6.34 Consider each residential or business unit of multiple dwellings as a separate establishment.

6.35 List a combined residential and business unit only as a business establishment.

6.36 No two areas in the United States are identical in their characteristics and need for telephone service. It is the responsibility of those preparing a market study to find out which standard characteristics are common to the area and which characteristics are unique to the community. Approval of the criteria to be established in classifying unserved establishments should be obtained from the REA Loans and Operations Field Representative.

6.4 Further Criteria in Classifying Establishments:

6.41 Certain categories of establishments may be discounted as telephone prospects in some areas. For example, migratory housing units, weekend canins in a resort or fishing area, and abandoned homes in an area of declining population, will rarely be a source of telephone demand. In these cases it will be appropriate to omit these establishments from the count of establishments, but they should be included on the map as a circle with an "N" inserted to indicate that these establishments are not to be considered as potential subscribers.

6.42 Classify vacated dwellings which are still inhabitable in accordance with their condition and with the surrounding neighborhood. Where the general trend in the area is such that vacated dwellings are being removed or torn down, and if it appears that the dwellings have been vacant for some time, do not consider them as prospects and designate them "N".

6.43 Classify homes under construction generally as "A" prospects or in accordance with the appearance of neighboring new dwellings.

6.44 Consider unserved business establishments usually as "A" prospects. The combination small store and residence will generally require only a single telephone. Estimate the grade of service based on the type and size of the business. The narrative should provide information on possible large telephone users who are future potentials for multiple circuits or small PBX boards.

6.45 Use judgment when classifying schools and churches. The one-room schoolhouse may be only a "C" prospect for telephone service whereas the consolidated schoolhouse should be considered an "A" prospect. Similarly, the classification of churches will depend on individual circumstances. Where the parsonage is located near the church, a single telephone may serve both. However, where the church is the center of considerable social activity, it should be classified as an "A" prospect.

6.46 Classify the homes of doctors, dentists, veterinarians, and real estate and insurance salesmen as "A" prospects regardless of outward appearances.

6.47 Apartment developments are frequently encountered in suburban areas. Classify each apartment in a multiple dwelling unit. Generally, the classification will be the same, depending upon the general appearance, location, and economic characteristics of the area and its inhabitants.

6.5 Proportion of Unsigned to be Included:

6.51 Apply percentage factors to each class of prospects to estimate the five year market for telephone service. Interview a representative sample of "A", "B" and "C" establishments for the purpose of determining applicable percentages. This sample should be random and consistent to obtain reliable results. Where the characteristics of the central office areas (or parts of areas) differ, separate sample interviews should be undertaken.

6.52 The proportion of prospects likely to take service may generally fall within the following ranges:

Establishment Classification	Percent of Prospects Likely to take Service in 5 Years
A	65-100
B	35- 64
C	0- 34

6.53 The percentage ranges furnished above are intended only as a guide. Local conditions and the result of sample interviews are necessary and will provide the most reliable indications of local telephone needs.

6.54 Include in the ACS narrative, the percentages applied to the A, B and C establishments for each exchange.

SAMPLE

AREA COVERAGE SURVEY WORKSHEET

DATE OF THIS REPORT | PAGE OF PAGES

NAME OF COMPANY

BRIEF DESCRIPTION OF SECTION BEING SURVEYED

INSTRUCTIONS: *Prepare original only. Surveyors need sign last page only. For detailed instructions see REA Bulletin 322-1.*

MAP REF. NO.	NAME AND ADDRESS (Or other identifying information)	PROPOSED GRADE OF SERVICE*		POTENTIAL SUBSCRIBER (Check Class)			REMARKS
		EXIST. SUB-SCRIB-ERS	SIGNED APPLI-CANTS	I	V	S	

SIGNATURES OF SURVEYORS

*SYMBOLS FOR GRADE OF SERVICE: B1 ONE-PARTY BUSINESS; RB RURAL BUSINESS (MULTIPARTY); PS PAYSTATION; PBX PRIVATE BRANCH EXCHANGE; R1 ONE-PARTY RESIDENCE; R2 TWO-PARTY RESIDENCE; RR RURAL RESIDENCE

SAMPLE

AREA COVERAGE SURVEY WORKSHEET

DATE OF THIS REPORT | PAGE OF PAGES

NAME OF COMPANY

BRIEF DESCRIPTION OF SECTION BEING SURVEYED

INSTRUCTIONS: *Prepare original only. Surveyors need sign last page only. For detailed instructions see REA Bulletin 322-1.*

MAP REF. NO.	NAME AND ADDRESS *(Or other identifying information)*	PROPOSED GRADE OF SERVICE*		POTENTIAL SUBSCRIBER *(Check Class)*			REMARKS
		EXIST. SUBSCRIBERS	SIGNED APPLICANTS	A	B	C	

SIGNATURES OF SURVEYORS

*SYMBOLS FOR GRADE OF SERVICE:

B1 ONE-PARTY BUSINESS
RB RURAL BUSINESS (MULTIPARTY)
PS PAYSTATION
PBX PRIVATE BRANCH EXCHANGE
R1 ONE-PARTY RESIDENCE
R2 TWO-PARTY RESIDENCE
RR RURAL RESIDENCE

APPENDIX B

INSTRUCTIONS FOR PREPARING REA FORM 569

The following instructions cover the completion of REA Form 569, "Area Coverage Survey Report", to be included with the engineering studies and cost estimates in support of a loan application.

A. General:

1. Complete an original and four copies of the form for each central office area. Where the system has more than one central office, complete a summary form covering all central offices in the proposed system and insert the words "Entire System" under "Name of Central Office" in the heading.

2. Indicate (on the appropriate lines in the heading) the corporate name of the loan applicant; the loan application designation, and the central office area.

3. Part A contains data on Area Coverage. Part B covers data on service requirements. Parts C through F, on page 2, provide for data on special services.

B. Completion of Part A:

Line A-1, Total Number of Existing Establishments:

Record the total number of existing establishments (except those designated as "N") in the exchange or system. Indicate, by checking the appropriate box, whether this figure was estimated or based on the results of a field survey.

Line A-2, Number of Existing Inhabited Establishments:

Record the number of existing establishments which are presently inhabited in the exchange or system. Indicate, by checking the appropriate box, whether this figure is estimated or based on the results of a field survey.

Line A-3, Percent of Existing Inhabited Establishments With Service:

The percent of existing inhabited establishments with service is obtained by dividing Part B, line 1, Column 1 by Part A, line 2.

Line A-4, Estimated Number of Future Establishments:

Record the total number of future establishments expected to be constructed within the five year forecast period.

C. Completion of Part B:

Line B-1, Present Subscribers:

a. Obtain current information from station records. Where there are key systems, consider each system as one "other subscriber" and the additional stations as business or residence extensions. Where there are PBX systems, enter each as one "other subscriber" and include the extensions under business extensions. In either of the above cases, or where radiotelephone or other services are provided, complete page 2 of Form 569 in detail. Do not include radiotelephone subscribers on Line A-1. Next to the "As of (date)," show the date on which the data was compiled.

b. Service stations should not be included in the Total Subscribers column. (See instructions for completion of line B-2).

c. "Extensions" Column: Show in these columns, on the appropriate lines, the number of extensions, by class of service (business or residence), in service and to be connected by the end of the fifth year. This will include the extensions on key, PBX and PABX systems.

Line B-2, Line One Adjusted For Regrades:

Review present grades of service entered on Line A-1 and adjust to reflect the anticipated grades of service present subscribers will require within five years. The totals shown under the Total Subscribers column on Line B-2 should be the same as that on Line B-1 except when preloan service stations will become regular subscribers of the borrower.

Line B-3, Held Orders:

Show the number of existing unserved establishments that are covered by "Held Orders" in the office records and the anticipated grades of service, including extensions, if any.

rom Existing Establishments:

a. Under Total Subscribers column, show the total number of existing unserved establishments expected to be connected during the five year forecast period.

b. Under "Business" and "Residence" columns, classify, by grades of service, the total subscriber estimate.

c. Under "Service Station" column, show the number of service stations on any service station lines remaining in the proposed system at the end of the fifth year.

Line B-5, New Subscribers From Future Establishments:

a. Under "Total Subscribers" column, show the total number of future establishments expected to be connected during the five year forecast period.

b. Under "Business" and "Residence" column, classify, by grades of service, the total subscriber estimate.

Line B-6, Total Establishments to be Connected:

a. Under Total Subscribers:

Show the total number of establishments which will be connected during the five year forecast period. This will be the sum of lines B 2 through B 5.

b. Under "Business" and "Residence":

Classify, by grades of service, the total subscriber estimate. The totals for each grade will be the sum of lines B 2 through B 5.

Line B-7, Anticipated Outward Movement:

a. Under Total Subscribers:

Enter the anticipated outward movement, if any, of existing telephone subscribers. This is, basically, a projection of the estimated number of idle services the system may have at the end of the fifth year. Consideration should be given to projecting outward movement when it may have an effect on financial projections.

b. Under "Business" and "Residence":

Classify, by grades of service, the anticipated outward movement.

Line B-8, Total Five Year Subscribers:

a. Under Total Subscribers:

Show the total number of subscribers expected to be in service at the end of the fifth year of the forecast period. This will be the difference between line B 6 less line B 7 (if an entry has been made on line B 7).

b. Under "Business" and "Residence":

Classify, by grades of service, the total 5-year subscriber estimate. This will be the difference between line B 6 less line B 7 (if entries have been made on line B 7).

Line B-9, Graded Service Outside the B. R. A.:

Enter on this line the number of subscribers included on line B-8 to receive graded service outside the base rate area. (This line should not be completed by systems upgrading to all one-party service).

Line B-10, Average Mileage Outside the B. R. A.:

Enter the average mileage outside the base rate area for those subscribers shown on line B 9. If service is to be zoned, include in the Remarks Section a tabulation showing the number of subscribers in each zone by class and grade of service, and the required distances involved. (This line should not be completed by systems upgrading to all one-party service).

Seasonal Subscribers:

If there are Seasonal Subscribers in the proposed service area, indicate in the "Remarks" column (a) the number of seasonal establishments included on Line A-1 and (b) the number of seasonal subscribers by grades of service included on Line B 8.

D. Completion of Page 2 of Form 569:

1. General: This page is to be used in those cases where:

ntry has been made in the "Other Subscribers" column on
1 of Form 569.

hone service exists or is planned.

additional revenue producing services provided

2. Preparation of Part C: Key Systems

 a. "Existing": Enter the number of key systems presently being served and the number of incoming lines and extensions.

 b. "Proposed": Enter the total number of key systems proposed in the 5-year subscriber estimate. (This should include existing systems).

3. Preparation of Part D: PBX Systems

 a. "Existing": Enter the number of PBX or PABX systems presently being served, by size and type.

 b. "Proposed": Enter the total number of PBX or PABX systems proposed in the 5-year forecast. (This should include existing systems).

4. Preparation of Part E: Radiotelephone

 a. "Existing": Show the present number of radiotelephone systems in operation by size (the number of subscribers and the number of official stations used for operations and maintenance).

 b. "Proposed": Enter the total number of radiotelephone systems proposed in the 5-year forecast. (This should include existing systems).

 c. For details on radiotelephone requirements and procedures, refer to REA Bulletin 385-1, "Preloan Procedures and Requirements for Two-Way Radiotelephone Service."

5. Preparation of Part F: Additional Revenue Producing Services

 a. "Existing": Show any significant revenue producing services not shown elsewhere. (This might include such services as private lines, TWX circuits, FX arrangements, etc.) Provide description of the service, number, and revenue received.

 b. "Proposed": Enter the total number of additional revenue producing services, not shown elsewhere, which are proposed in the 5-year forecast. (This should include existing services).

Attachment:
REA Form 569, Pages 1 and 2

Form Approved
OMB No. 40-R2647

USDA - REA

AREA COVERAGE SURVEY REPORT

INSTRUCTIONS - *Prepare original and 4 copies. Complete Page 2 only in cases stated at top of that page. For further instructions see REA Bulletin 322-1 or Section 206, Telephone Engineering and Construction Manual.*

NAME OF LOAN APPLICANT

LOAN APPLICATION DESIGNATION

NAME OF CENTRAL OFFICE

PART A. AREA COVERAGE DATA

1. TOTAL NUMBER OF EXISTING ESTABLISHMENTS. (☐ *Estimated* ☐ *Based on Field Survey)*	
2. NUMBER OF EXISTING INHABITED ESTABLISHMENTS. (☐ *Estimated* ☐ *Based on Field Survey)*	
3. PERCENT OF EXISTING INHABITED ESTABLISHMENTS WITH SERVICE. *(Part B, Item 1, "Total Subscribers" Col. ÷ Part A, Item 2)*	
4. ESTIMATED NUMBER OF FUTURE ESTABLISHMENTS.	

PART B. PROPOSED CENTRAL OFFICE AREA

SOURCE OF SERVICE REQUIREMENTS	TOTAL SUBSCRIBERS	BUSINESS						RESIDENCE					SERVICE STA.	EXTENSION	
		1 PARTY	2 PARTY	4 PARTY	RURAL ()	PAY STA.	OTHER SUBS.	1 PARTY	2 PARTY	4 PARTY	RURAL ()	OTHER SUBS.		BUS.	RES.
1. PRESENT SUBSCRIBERS AS OF *(Date)*															
2. LINE 1 ADJUSTED FOR REGRADES															
3. HELD ORDERS															
4. NEW SUBS. FROM EXISTING ESTABLISHMENTS															
5. NEW SUBS. FROM FUTURE ESTABLISHMENTS															
6. TOTAL ESTABLISHMENTS TO BE CONNECTED															
7. ANTICIPATED OUTWARD MOVEMENT															
8. TOTAL 5 YEAR SUBSCRIBERS															
9. GRADED SERVICE OUTSIDE B.R.A.															
10. AVERAGE MILEAGE OUTSIDE B.R.A.															

REMARKS

SIGNATURES	DATE
1. FOR THE APPLICANT	
2. REA LOANS AND OPERATIONS FIELD REPRESENTATIVE	
3. REA FIELD ENGINEER	

REA FORM. 569 REV 4-71

AREA COVERAGE SURVEY REPORT *(Cont'd)*

LOAN APPLICATION DESIGNATION	NAME OF CENTRAL OFFICE

NOTE: Complete this page in cases where the system has or proposed to have:

1. Key Systems (Part C)
2. PBX Systems (Part D)
3. Radio Telephone Service (Part E)
4. Other revenue producing services not shown elsewhere.

(The systems included in Parts C and D should be transferred to the "Other Subscriber" column on Page 1, Part B. The number of extensions shown in Parts C and D should be included under the appropriate "Extension" columns on Page 1, Part B.)

PART C. KEY SYSTEMS

EXISTING			PROPOSED *(including existing)*		
NO. OF SYSTEMS	LINES	EXTENSIONS	NO. OF SYSTEMS	LINES	EXTENSIONS

PART D. PBX SYSTEMS

EXISTING				PROPOSED *(including existing)*			
NO. OF SYSTEMS	TRUNKS	EXTENSIONS	OPERATION	NO. OF SYSTEMS	TRUNKS	EXTENSIONS	OPERATION

PART E. RADIO TELEPHONE

EXISTING			PROPOSED *(including existing)*		
NO. OF SYSTEMS	SUBSCRIBERS	OFFICIAL STATIONS	NO. OF SYSTEMS	SUBSCRIBERS	OFFICIAL STATIONS

PART F. ADDITIONAL REVENUE PRODUCING SERVICES

EXISTING			PROPOSED *(including existing)*		
DESCRIPTION	NUMBER	REVENUE	DESCRIPTION	NUMBER	REVENUE

APPENDIX C

A. Reference Material Available on Population and Economic Trends: An integral part of the subscriber forecasting process is to review population and economic trends. The following selected statistical source data is available to telephone systems.

1. The Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

a. Measuring markets - A Guide to the Use of Federal and State Statistical Data. 1966

A very good source data book of statistical information for telephone companies. 94 pp., $.50 U. S. Dept. of Commerce.

b. Directory of Federal Statistics for Local Areas - A Guide to Sources. 1966

Guide to local area socio-economic data contained in 182 publications of 33 Federal agencies. 164 pp., $1.00 (paper)

c. County and City Data Book.*

Statistics for every State, county and standard metropolitan statistical area, and for 675 cities. 713 pp., $5.50 (cloth)

d. Directory of Federal Statistics for States - A Guide to Sources. 1967

Guide to state area socio-economic data published by various U. S. Government departments and agencies. 372 pp., $2.25

e. Practical Business Use of Government Statistics.

Small Business Administration, Washington, D. C.
Small Business Management Series No. 22
33 pp., $.20

f. Statistical Abstract of the United States. (Annual)*

The national data book and guide to sources.
Basic statistical guide Over 1050 pp., $4.00 (cloth)

* Usually available in libraries.

2. Available from State and Other Agencies:

a. **ALABAMA**

Economic Abstract of Alabama. Center for Bus. and Economic Res., U. of Alabama, University, Ala. 35486. 200 pp. $3.

ALASKA

Look North, An Economic Handbook for Alaska. Dept. of Economic Development, Pouch EE, Juneau, Alaska 99801. 1969. 40 pp. Free.

ARIZONA

Arizona Statistical Review. (25th ed.) Valley Natl. Bank, Tucson, Ariz. 85701. 1969. 48 pp. Free.

ARKANSAS

Arkansas Almanac, 1969. (11th ed.) Arkansas Almanac, Inc., Little Rock, Ark. 72203. 1969. 320 pp. $2.

CALIFORNIA

California Statistical Abstract. (9th ed.) Documents Section, P.O. Box 20191, Sacramento, Calif. 95820. 1968. 232 pp. $5.50.

COLORADO

Colorado Yearbook, 1962-1964. (26th ed.) Division of Accounts and Control, Dept. of Admin., Denver, Colo. 80203. 1072 pp. $5.50.

CONNECTICUT

Connecticut Market Data. Res. and Information Div., Connecticut Development Commission, Hartford, Conn. 06115. 128 pp. Free.

DELAWARE

A Statistical Profile of the State of Delaware. Delaware State Planning Office, Newark, Del. 19711. 7 pp. Free.

FLORIDA

Florida Statistical Abstract, 1969. (3d ed.) Bur. of Economic and Bus. Res., U. of Florida, Gainesville, Fla. 32601. 1969. 492 pp. $4.50.

GEORGIA

Georgia Statistical Abstract, 1968. Bur. of Bus. and Economic Res., U. of Georgia, Athens, Ga. 30601. 1968. 408 pp. $5.

HAWAII

The State of Hawaii Data Book: A Statistical Abstract. (2d ed.) Dept. of Planning and Economic Dev., Honolulu, Hawaii 96814. 1968. 69 pp. Free.

IDAHO

Idaho Blue Book. Secretary of State, State House, Boise, Idaho 83702. 1969. 105 pp. Free.

ILLINOIS

Economic Base Profiles of Illinois Counties. Dept. of Bus. and Economic Development, 222 S. College, Springfield, Ill. 62706. 1968. (Varied paging for each county.) Free.

INDIANA

Statistical Abstract of Indiana Counties. Indiana State Chamber of Commerce, Board of Trade Bldg., Indianapolis, Ind. 46204. 194 pp. $5.

IOWA

Statistical Abstract of Iowa. Res. Div., Iowa Development Commission, 250 Jewett Bldg., Des Moines, Iowa 50309. 1969. 48 pp. Free.

KANSAS

Kansas Statistical Abstract, 1968. (4th ed.) Center for Reg. Studies, U. of Kansas, Lawrence, Kans. 66044. 1969. 84 pp. $3.

KENTUCKY

Deskbook of Kentucky Economic Statistics. (7th ed.) Div. of Res. and Planning, Dept. of Commerce, Frankfort, Ky. 40601. 31 pp. Free.

LOUISIANA

Statistical Abstract of Louisiana. (3d ed.) Div. of Bus. and Economic Res., Louisiana State U., New Orleans, La. 70122. 1969. 409 pp. $3.65.

MAINE

Maine Pocket Data Book. Dept. of Economic Development, State Office Bldg., Augusta, Maine 04330. 1969. 252 pp. $2.

MARYLAND

Statistical Abstract. Dept. of Economic Development, Annapolis, Md. 21401. 170 pp. $2.50.

MASSACHUSETTS

Facts Book. Dept. of Commerce and Development, Boston, Mass. 02202. 1969. 56 pp. Single copy free.

MICHIGAN

Michigan Statistical Abstract. (7th ed.) Bur. of Bus. and Economic Res., Michigan State U., East Lansing, Mich. 48823. 475 pp. $4.75.

MINNESOTA

A Statistical Profile of the State of Minnesota. (4th ed.) Dept. of Economic Development, 57 West 7th St., Saint Paul, Minn. 55102. 43 pp. Free.

MISSISSIPPI

Mississippi Statistical Abstract. Bur. of Bus. and Economic Res., Mississippi State U., State College, Miss. 39762. 1969. 458 pp. $3.75.

MISSOURI

Data for Missouri Counties. Mail Room, Extension Div., U. of Missouri, Columbia, Mo. 65201. (Loose leaf; updated periodically.) $5.

MONTANA

Montana Statistical Yearbook. Mont. State Dept. of Planning and Economic Development, Helena, Mont. 59601. 46 pp. Free.

NEBRASKA

Nebraska Statistical Handbook. Div. of Ind. and Information Service, Dept. of Economic Development, Lincoln, Nebr. 68508. (Updated periodically--new edition available Fall, 1970.)

NEVADA

Nevada Community Profiles. Dept. of Economic Development, Carson City, Nev. 89701. 127 pp. Free.

NEW JERSEY

The New Jersey Almanac. The New Jersey Almanac, Inc., Cedar Grove, N.J. 07009. 768 pp. $2.95.

NEW MEXICO

The State's Economy in 1968. *New Mexico Business,* Bur. of Bus. Res., U. of New Mexico, Albuquerque, N.M. 87106. Vol. 22, Mar. 1969. 66 pp. Single reprint $1.

NEW YORK

New York State Statistical Yearbook. (2d ed.) Office of Stat. Coordination, Div. of the Budget, Albany, N.Y. 12207. 1968-1969. 239 pp. Free.

NORTH CAROLINA

Statistical Index, North Carolina State Government. Services Sect., Budget Div., Raleigh, N.C. 27601. 1969. 30 pp. Free.

NORTH DAKOTA

North Dakota Growth Indicators. (6th ed.) Bus. and Ind. Development Dept., Bismarck, N.Dak. 58501. 1969. 59 pp. Free.

OHIO

Statistical Abstract of Ohio: 1969. Economic Res. Div., Development Dept., Columbus, Ohio 43215. 409 pp. $4.

OKLAHOMA

Oklahoma Data Book, 1968. Bur. for Bus. and Economic Res., U. of Oklahoma, Norman, Okla. 73069. 172 pp. $4.

OREGON

Oregon Economic Statistics, 1969. Bur. of Bus. and Economic Res., U. of Oregon, Eugene, Oreg. 97403. 87 pp. $4.

PENNSYLVANIA

Pennsylvania Statistical Abstract, 1969. (11th ed.) Bur. of Statistics, Dept. of Commerce, Harrisburg, Pa. 17125. 402 pp. $2.

RHODE ISLAND

Rhode Island Basic Economic Statistics. Res. Div., Rhode Island Development Council, Roger Williams Bldg., Providence, R.I. 02908. 164 pp. Free.

SOUTH CAROLINA

General Statistics on South Carolina. Res. Div., State Development Board, Columbia, S.C. 29202. 1968. 48 pp. Free.

TENNESSEE

Tennessee Statistical Abstract, 1969. Center for Bus. and Economic Res., U. of Tennessee, Knoxville, Tenn. 37916. 707 pp. $4.

TEXAS

Texas Almanac, 1970-71. *Dallas Morning News,* Dallas, Tex. 75222. 1969. 704 pp. $2.70.

UTAH

1969 Statistical Abstract of Utah. Bur. of Economic and Bus. Res., U. of Utah, Salt Lake City, Utah 84112. 227 pp. $3.

VIRGINIA

Statistical Abstract of Virginia: (Vol. I) Thomas Jefferson Center for Political Economy, U. of Virginia, Charlottesville, Va. 22903. 313 pp. $6.50. (Vol. II, in preparation.)

WASHINGTON

The Research Council's Handbook. (3d ed.) Washington State Research Council, 1069 Capitol Way, Olympia, Wash. 98501. 647 pp. $9.75.

WEST VIRGINIA

County Study Data Book: Measures of Social Change in West Virginia, 1940-1965. Agricultural Exp. Station and Office of Res. and Dev., Morgantown, W.Va. 26506. 105 pp. $1.50.

WISCONSIN

Wisconsin Statistical Abstract. Document Sales, Dept. of Administration, One West Wilson St., Madison, Wis. 53702. 1969. 148 pp. $2.

WYOMING

Wyoming Data Book. Div. of Bus. and Economic Res., U. of Wyoming, Laramie, Wyo. 82070. 148 pp. $4.

NOTE: Prices given where known. Statistical data are not available for South Dakota, New Hampshire and Vermont.

APPENDIX D

1. Checklist for Review of Area Coverage Survey. The following checklist provides guidelines for review of the ACS data.

A. Area Coverage Survey Maps

Do the ACS Maps:

	Check Applicable Column		
	Yes	No	Not Applicable
1. Conform to the proposed service area agreed upon as to the territory to be surveyed?			
2. Exclude areas served by other companies unless a firm commitment has been obtained from the owners to sell or abandon the facilities?			
3. Identify all establishments as (1) existing subscribers, (2) signed applicants, (3) potential subscribers, or (4) N (not a prospect for service)?			
4. Show grades of service for all establishments where more than one grade of service is offered?			
5. Show location of future growth areas?			
6. Identify idle services?			
7. Show the percentage of unserved establishments expected to take service (unless ABC method of forecasting is utilized)?			
8. Define the base rate area (if applicable) and corporate limits of towns over 1,500 population.			

B. Narrative

Does the narrative include:

	Check Applicable Column		
	Yes	No	Not Applicable
1. A description of existing service and adequacy of plant facilities to furnish various grades of service?			
2. A station history of each exchange by class and grades of service?			
3. Existing monthly rates and mileage or construction charges?			
4. An analysis of the causes of changes in past demand trends by exchanges?			
5. An analysis of inward and outward movement of telephone service and its affect on net subscriber gain?			
6. A description of economic characteristics of the area including current economic changes?			
7. An analysis of population changes in the area?			
8. A description of unusual growth situations such as planned housing developments, new or broadened highways, (etc.)?			
9. Analysis and breakdown of numbers of existing and proposed urban and rural users for each central office area containing a town of over 1,500 population?			

	Check Applicable Column		
	Yes	No	Not Applicable
10. Discussion of PBX installations, key systems, radio-telephone and other significant revenue producing facilities?			
11. Discussion of existing and proposed EAS?			
12. The percentages applied to unserved establishments which are expected to be connected?			

APPENDIX E

Statistical Techniques in the Forecasting Process

Statistical techniques can serve as useful tools in telephone subscriber forecasting. These techniques are not intended as a substitute for the forecasting methods described in Appendix A. They can, however, be helpful as a check on the forecaster's judgment if used with care.

1. Average Method:

Statistical methods are not new to telephone subscriber forecasting. A common method frequently used is the average method. An average is a single figure used to represent a mass of data. For example, the average subscriber gain in the data shown in figure 1 is 82 main stations. This was determined by subtracting 1,220 main stations in 1962 from 1,878 main stations in 1970 to arrive at a difference of 658 main stations. The 658 main stations is divided by 8 years for an average gain of 82 main stations per year.

The average method may produce substantially the same results as the linear trend method discussed later. It all depends on how the number of main stations in the last historical year compares to the trend of the time period being considered. In the average method, any substantial deviation from the trend occuring in the last historical year will be repeated in every subsequent future year estimate because it is the base to which the average annual increment is added.

2. Analysis of Historical Data:

The starting point for most forecasting methods begins with a review of known historical data. The reason is to obtain a clue about the future direction this historical pattern may reasonably be expected to take. The length of the period should include not less than eight to ten years. The data for telephone subscriber forecasting is usually the number of main stations in a given exchange or system. An example of the historical growth of main stations is presented in figure 1.

Figure 1.
Historical Growth of Main Stations

Year	Main Stations
1962	1,220
1963	1,401
1964	1,478
1965	1,523
1966	1,566
1967	1,647
1968	1,723
1969	1,769
1970	1,878

2.1 Description of Change:

The analysis of historical data consists of two steps. The first step would include a description of the various changes as they occur during the period of time studied. Presentation of the historical data in graphic form (figure 2) shows the year-to-year growth or decline occuring during the period covered. The factors which cause changes or variations in the number of main stations such as housing developments, new factories, farm consolidations, population gains or losses, family income, effects of upgrading, and other social-economic factors need to be analyzed and described.

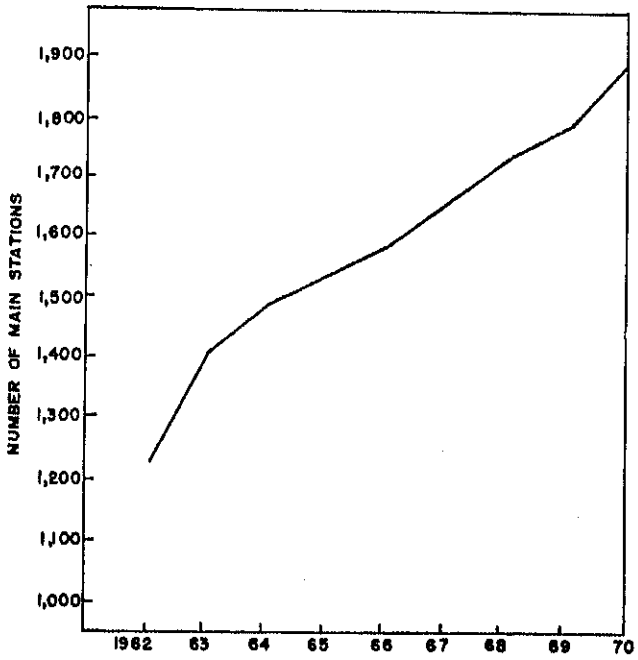


FIGURE 2

2.2 Measurement of Trends:

The second step would involve measuring trends. This means fitting a trend line through a graph of historical data in a way to describe the long period movement. This may be accomplished by several methods.

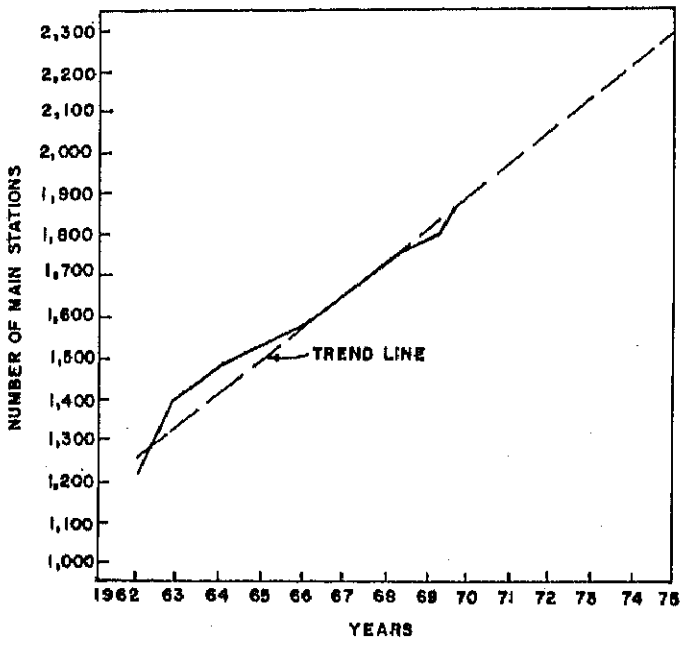


FIGURE 3

2.21 Freehand Method:

One method is the freehand method. To fit a trend by this method, draw a line through a graph of data in such a way as to describe what appears to the eye to be the long period movement. A line of trend fitted by this method is shown in figure 3. The drawing of this line may be accomplished with the aid of a transparent straight edge.

The advantages of this method are:

1. The method is simple.

2. The method may be used in place of a mathematic equation which may not logically describe the trend.

3. If drawn with care the trend line fitted by this method will be a close approximation to a mathematically fitted trend.

The disadvantages of this method are:

1. The results vary according to personal estimate.

2. Considerable practice is required to make a good fit.

2.22 Linear Trend Method:

Another method for measuring trends is a mathematical method called linear trend or least squares method. The linear trend produces a straight line through the actual historical data and can be projected for any year in the future. As with all kinds of forecasts, straight-line trends are indicative of the future providing significant conditions affecting growth in the past remain at the same growth rate over the period of the forecast. Thus, any major change in the economic makeup of the telephone service area would also invalidate the linear trend projections.

Since each future year is less like those in the distant past, each estimate for future years can be expected to deviate slightly more from actual results. Thus the premise of gradually changing conditions requires the conclusion that the precision of future years estimates will decline as one moves farther from the historic years. In short, the first year of the future years estimate is going to be better than the second in accuracy and the second better than the third, etc.

The use of the linear trend equation to forecast the estimated number of main stations in 1975 is shown in figure 4. The equation is based on the data shown in figure 1.

Linear Trend Equation:

Linear Trend Equation
Figure 4.

Years	Y	X	X^2	XY
1962	1,220	-4	16	-4,880
1963	1,401	-3	9	-4,203
1964	1,478	-2	4	-2,956
1965	1,523	-1	1	-1,523
1966	1,566	0	0	0
1967	1,647	+1	1	+1,647
1968	1,723	+2	4	+3,446
1969	1,769	+3	9	+5,307
1970	1,878	+4	16	+7,512
	14,205	0	60	+4,350

The columns above represent the following:

Y = The historical number of main stations taken from figure 1.
X = The number of years before and after the middle year 1966.
X^2 = The square of the figures in column X.
XY = The figure in column Y times the figure in column X.

The linear trend formula is $Yc = a + bX$
(Yc = The computed number of main stations in any given year.)

In this analysis, X represents the time period, in this case, year, and Yc is the computed number of main stations or trend value for period X. The constant "a" represents the computed number of main stations at the origin year or year to which the number 0 is arbitrarily assigned (in figure 4 it is 1966.) The "b" is the amount of increase or decrease in Yc (computed number of main stations) before or after the 0 year.

"a" and "b" may be calculated by the following formulae:

$a = \frac{\Sigma Y}{N}$ (N = total number of years observed, which is 9, for the years 1962 through 1970 in figure 4.)
(Σ = symbol for sum.

$b = \frac{\Sigma XY}{\Sigma X2}$

Therefore,

$a = \frac{14,205}{9} = 1,578$

$b = \frac{4,350}{60} = 72.5$ or 73

To forecast main stations for 1975, using the basic formula:

$Yc = a + bX$

And substituting the above values for a and b:

$Yc = 1,578 + 73X$
$Yc = 1,578 + 73(9)$ (Note: X is the number of years after 1966 (the 0 year). 1975 - 1966 = 9 years.)

$Yc = 1,578 + 657$
$Yc = 2,235$ main stations in 1975

The basic calculations for fitting a straight-line trend to the data are shown in figure 4. The results are "a" = 1,578 and "b" = 73.

This equation indicates that the computed main stations for 1966 is 1,578 and that this figure increases by 73 subscribers for each year after 1966.

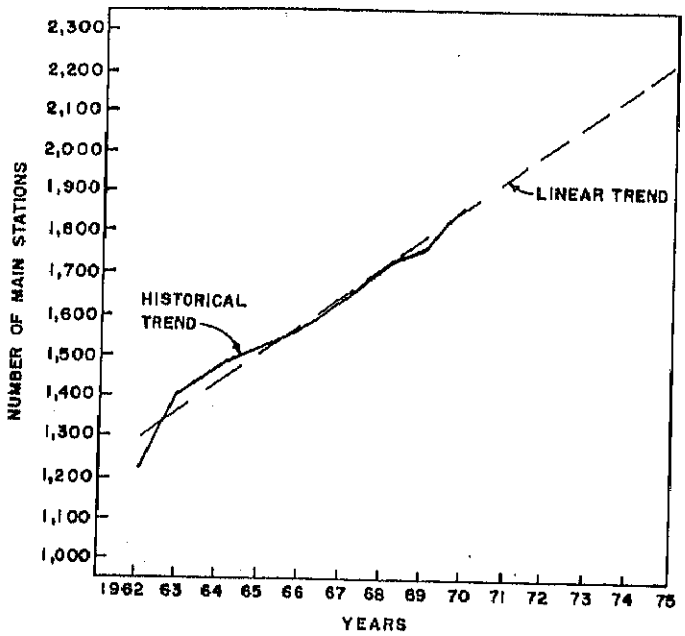


FIGURE 5 SUBSCRIBER DATA 1962-1970
TREND INDICATED BY A "LEAST SQUARES" STRAIGHT LINE

The trend is plotted in figure 5 by calculating Yc for several years (for example 1962, 1970) and connecting the points with a straight line. While only two points are needed to define a straight line, the plotting of three points provides a useful check on the calculations.

The advantages of the linear trend equation are:

1. The method expresses a trend in the form of a mathematical formula which may be easily interpreted.

2. Results obtained under the method are definite and independent of any subjective estimate on the part of the forecaster.

3. The resulting equation is in convenient form for extension into the future or past.

The disadvantages of the linear trend equation are:

2. The method is based on the assumption that the date follows a trend that can be expressed by a straight line.